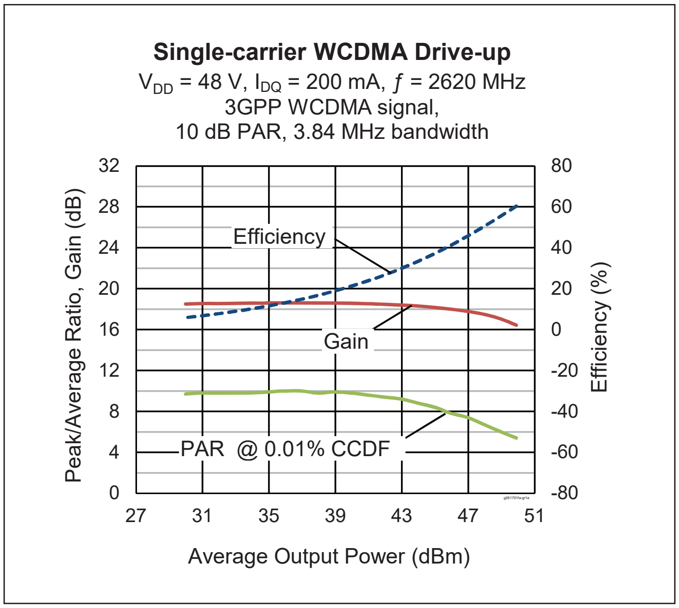
GTVA261701FA

Thermally-Enhanced High Power RF GaN on SiC HEMT
170 W, 50 V, 2620 – 2690 MHz

Package Types: H-37265J-2

Description

The GTVA261701FA is a 170-watt (P_{3dB}) GaN on SiC high electron mobility transistor (HEMT) for use in multi-standard cellular power amplifier applications. It features input matching, high efficiency, and a thermally-enhanced package with earless flange.



Features

- GaN on SiC HEMT technology
- Input Matched
- Typical CW performance, 2690 MHz, 48 V, single side
  - Output power at P_{3dB} = 170 W
  - Efficiency = 75%
  - Gain = 15 dB
- Human Body Model, Class 1B (per ANSI/ESDA/JEDEC JS-001)
- Capable of handling 10:1 VSWR @48 V, 40 W (CW) output power
- RoHS-compliant

RF Characteristics

Single-carrier WCDMA Specifications (tested in Wolfspeed test fixture)
V_{DD} = 48 V, I_{DQ} = 200 mA, P_{OUT} = 40 W avg, ƒ = 2690 MHz. 3GPP WDMA signal, 3.84 MHz channel bandwidth, 10 dB peak/average @ 0.01% CCDF.

Characteristic	Symbol	Min.	Typ.	Max.	Unit
Gain	G_{ps}	16	17	—	dB
Drain Efficiency	η_D	38	43	—	%
Adjacent Channel Power Ratio	ACPR	—	-29	-25	dBc

Note:
All published data at T_{CASE} = 25°C unless otherwise indicated
ESD: Electrostatic discharge sensitive device—observe handling precautions!

RoHS compliant

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DC Characteristics

Characteristic	Symbol	Min.	Typ.	Max.	Unit	Conditions
Drain-source Breakdown Voltage	$V_{BR(DSS)}$	150	—	—	V	V_{GS} = -8 V, I_D = 21 mA
Drain-source Leakage Current	I_{DSS}	—	—	5	mA	V_{GS} = -8 V, V_{DS} = 50 V
Gate Threshold Voltage	$V_{GS(th)}$	–3.8	–3.0	–2.3	V	V_{DS} = 10 V, I_D = 21 mA

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Drain Operating Voltage	V_{DD}	0	—	50	V	
Gate Quiescent Voltage	$V_{GS(Q)}$	—	–2.8	—		V_{DS} = 50 V, I_D = 1.0 A

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Drain-source Voltage	V_{DSS}	125	V
Gate-source Voltage	V_{GS}	–10 to +2	
Gate Current	I_G	20	mA
Drain Current	I_D	7.5	A
Junction Temperature	T_J	225	°C
Storage Temperature Range	T_{STG}	–65 to +150	

Operation above the maximum values listed here may cause permanent damage. Maximum ratings are absolute ratings; exceeding only one of these values may cause irreversible damage to the component. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. For reliable continuous operation, the device should be operated within the operating voltage range (V_{DD}) specified above.

Thermal Characteristics

Characteristics	Symbol	Value	Unit	Conditions
Thermal Resistance	$R_{\theta JC}$	1.07	°C/W	T_{CASE} = 70 °C, 50 W (CW), V_{DD} = 48 V, 2620 MHz

Ordering Information

Type and Version	Order Code	Package Description	Shipping
GTVA261701FA V1 RO	GTVA261701FA-V1-R0	H-37265J-2, earless flange	Tape & Reel, 50 pcs
GTVA261701FA V1 R2	GTVA261701FA-V1-R2	H-37265J-2, earless flange	Tape & Reel, 250 pcs

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Typical Performance (data taken in an Wolfspeed production test fixture)

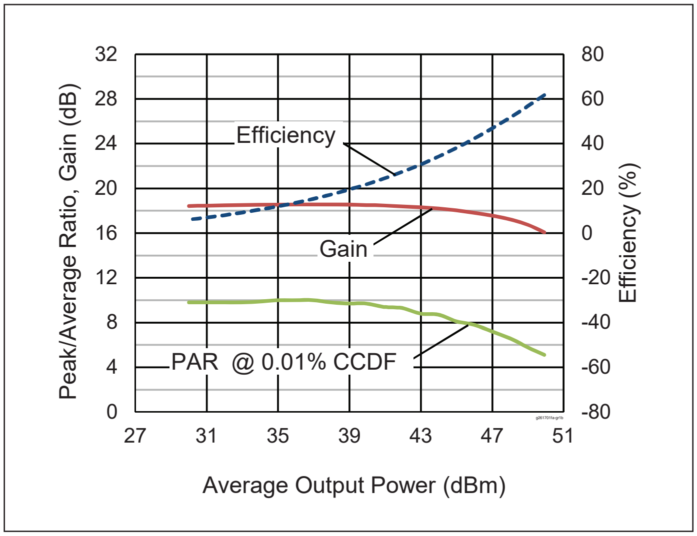

Figure 1. Single-carrier WCDMA Drive-up

V_{DD} = 48 V, I_{DQ} = 200 mA, f = 2655 MHz
3GPP WCDMA signal,
10 dB PAR, 3.84 MHz bandwidth

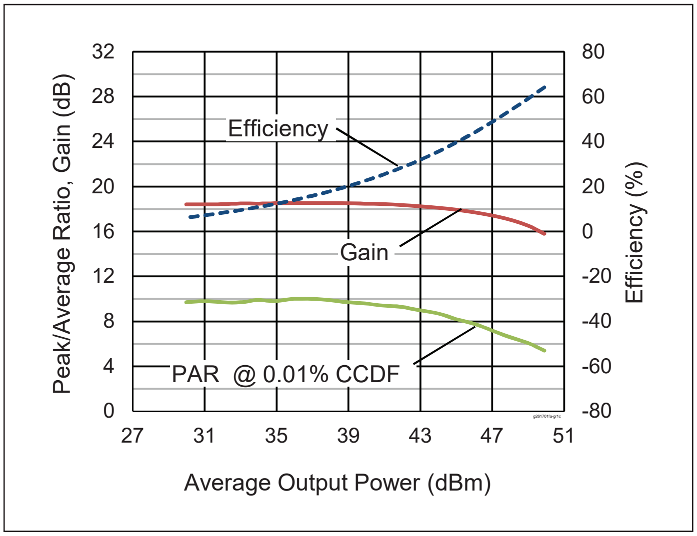

Figure 2. Single-carrier WCDMA Drive-up

V_{DD} = 48 V, I_{DQ} = 200 mA, f = 2690 MHz
3GPP WCDMA signal,
10 dB APR, 3.84 MHz bandwidth

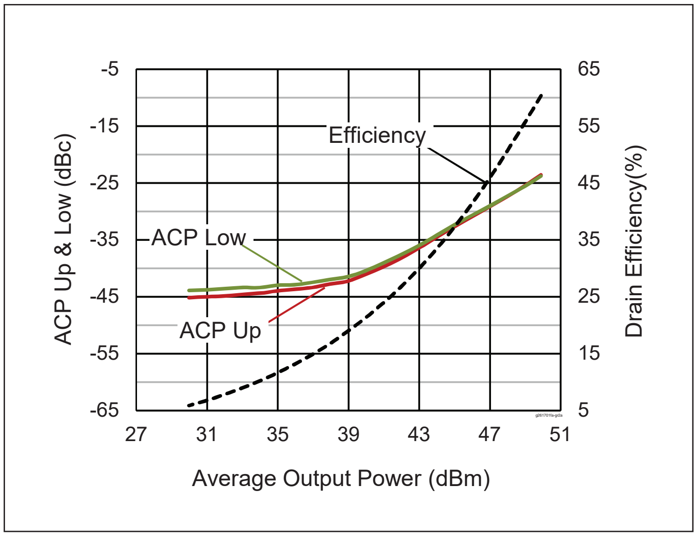

Figure 3. Single-carrier WCDMA Drive-up

V_{DD} = 48 V, I_{DQ} = 200 mA, f = 2620 MHz,
3GPP WCDMA signal,
10 dB PAR, 3.84 MHz bandwidth

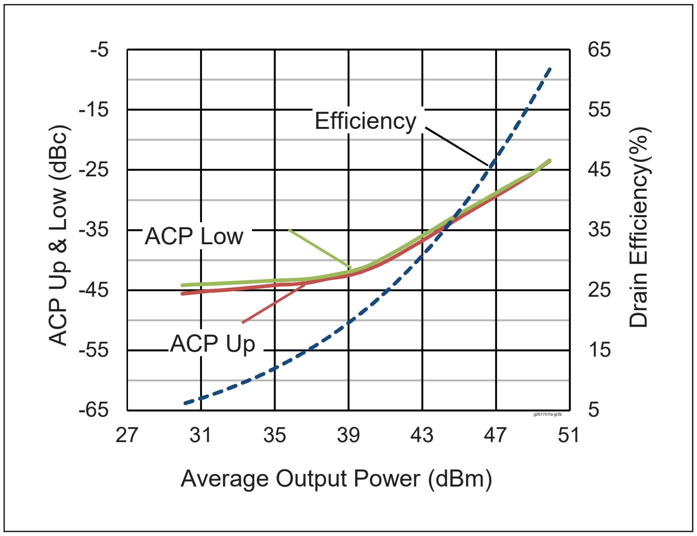

Figure 4. Single-carrier WCDMA Drive-up

V_{DD} = 48 V, I_{DQ} = 200 mA, f = 2655 MHz,
3GPP WCDMA signal,
10 dB PAR, 3.84 MHz bandwidth

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Typical Performance (cont.)

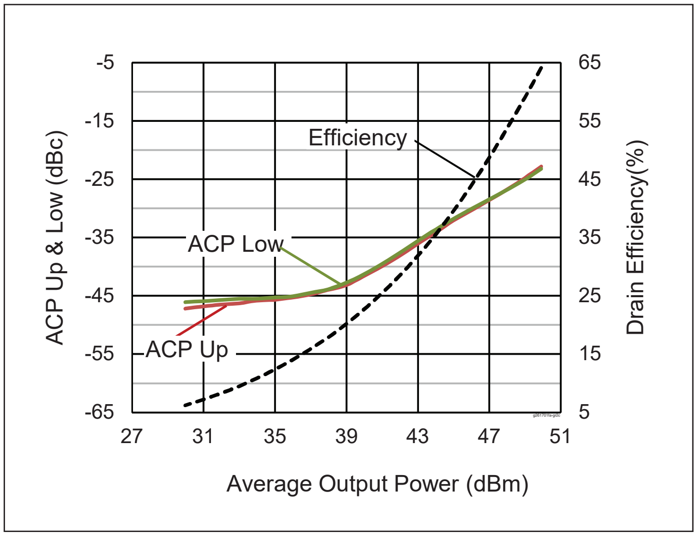

Figure 5. Single-carrier WCDMA Drive-up

V_{DD} = 48 V, I_{DQ} = 200 mA, f = 2690 MHz,
3GPP WCDMA signal,
10 dB PAR, 3.84 MHz bandwidth

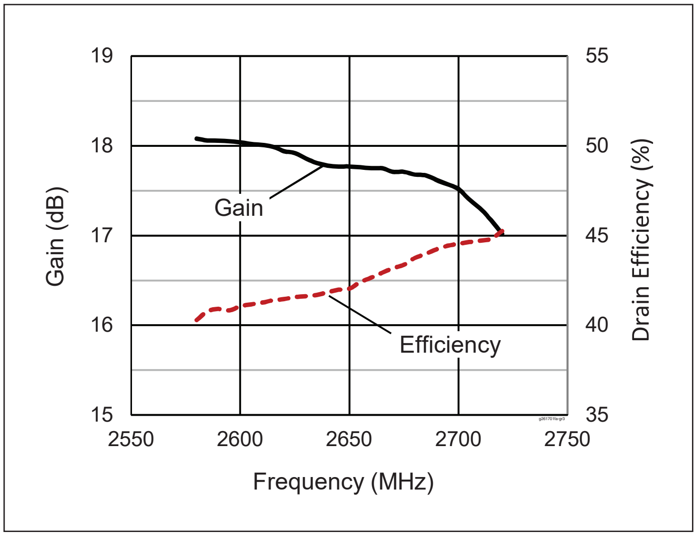

Figure 6. Single-carrier WCDMA Broadband Performance

V_{DD} = 48 V, I_{DQ} = 200 mA, P_{OUT} = 46.0dBm,
3GPP WCDMA signal, 10.0 dB PAR

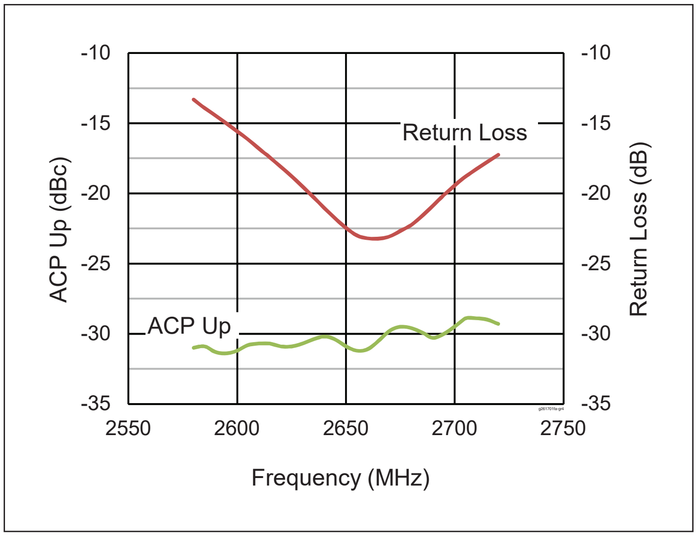

Figure 7. Single-carrier WCDMA Broadband Performance

V_{DD} = 48 V, I_{DQ} = 200 mA, P_{OUT} = 46 dBm,
3GPP WCDMA signal, 10.0 dB PAR

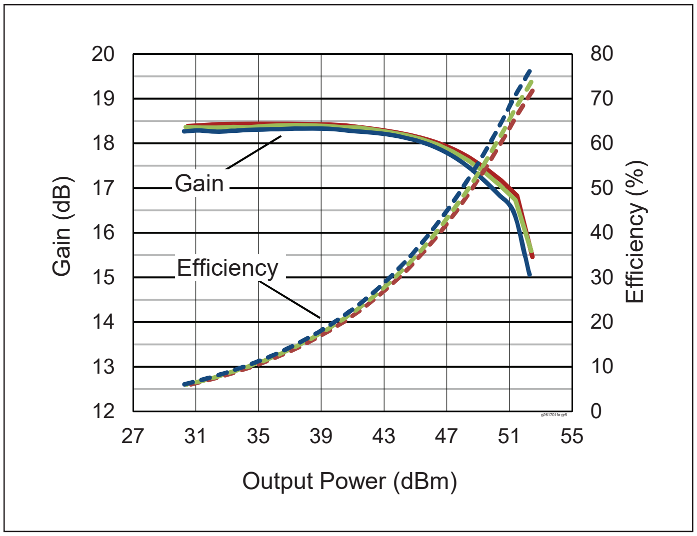

Figure 8. CW Performance

V_{DD} = 48 V, I_{DQ} = 200 mA

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Typical Performance (cont.)

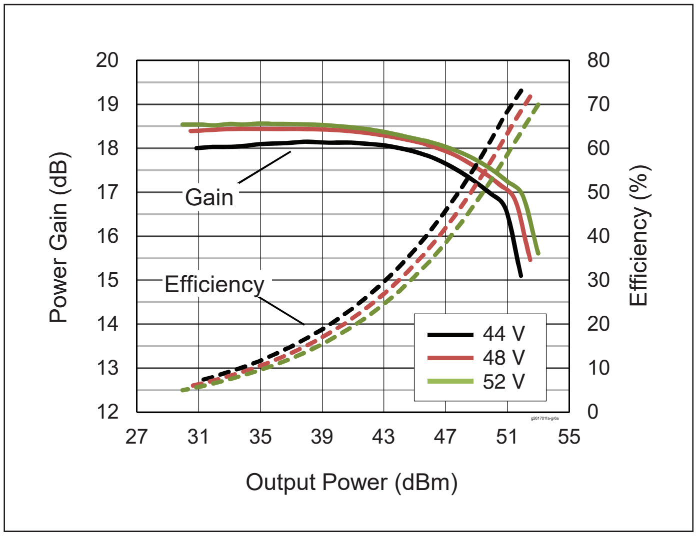

Figure 9. CW Performance at Specified V_{DD}

I_{DQ} = 200 mA, ƒ = 2620 MHz

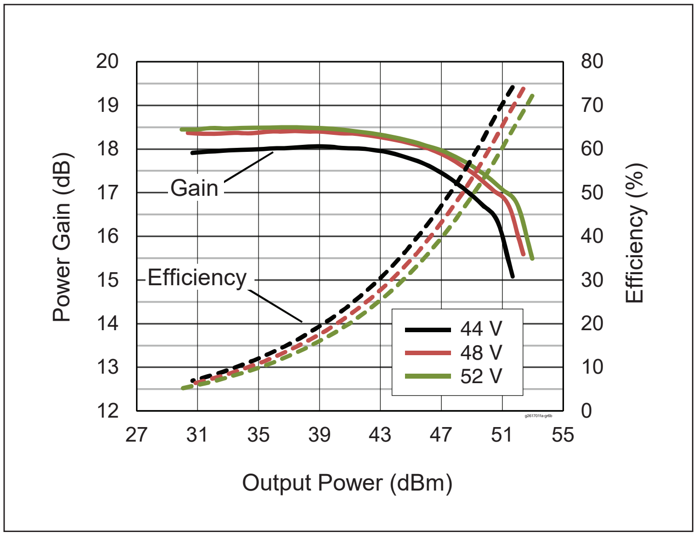

Figure 10. CW Performance at Specified V_{DD}

I_{DQ} = 200 mA, ƒ = 2655 MHz

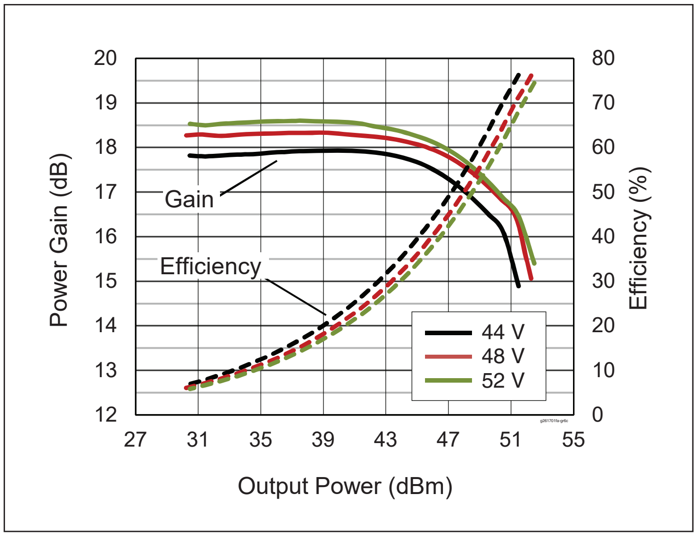

Figure 11. CW Performance at Specified V_{DD}

I_{DQ} = 200 mA, ƒ = 2690 MHz

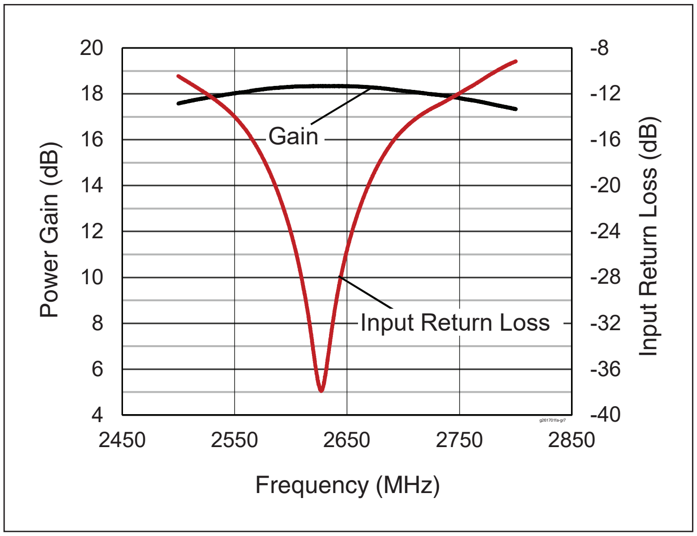

Figure 12. Small Signal CW Performance

V_{DD} = 48 V, I_{DQ} = 200 mA

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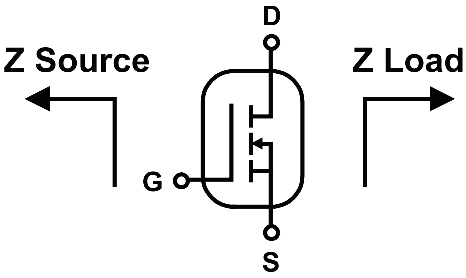
Load Pull Performance



Single side, pulsed CW signal – 10 µsec, 10% duty cycle; 48 V, 200 mA

Class AB		P_{3dB}									
		Max Output Power					Max Drain Efficiency				
Freq [MHz]	Z_s [Ω]	Z_l[Ω]	Gain [dB]	P_{OUT} [dBm]	P_{OUT} [W]	Efficiency [%]	Z_l[Ω]	Gain [dB]	P_{OUT} [dBm]	P_{OUT} [W]	Efficiency [%]
2620	12.0 – j5.7	2.9 – j2.0	15.0	53.81	240	64.8	2.1 – j0.0	16.7	51.62	145	76.9
2655	15.0 – j8.0	2.6 – j2.3	14.8	53.68	233	65.3	2.2 – j0.2	16.3	51.76	150	75.9
2690	16.6 – j10.0	2.8 – j2.2	14.6	53.71	235	66.7	2.1 – j0.2	16.1	51.93	156	77.0

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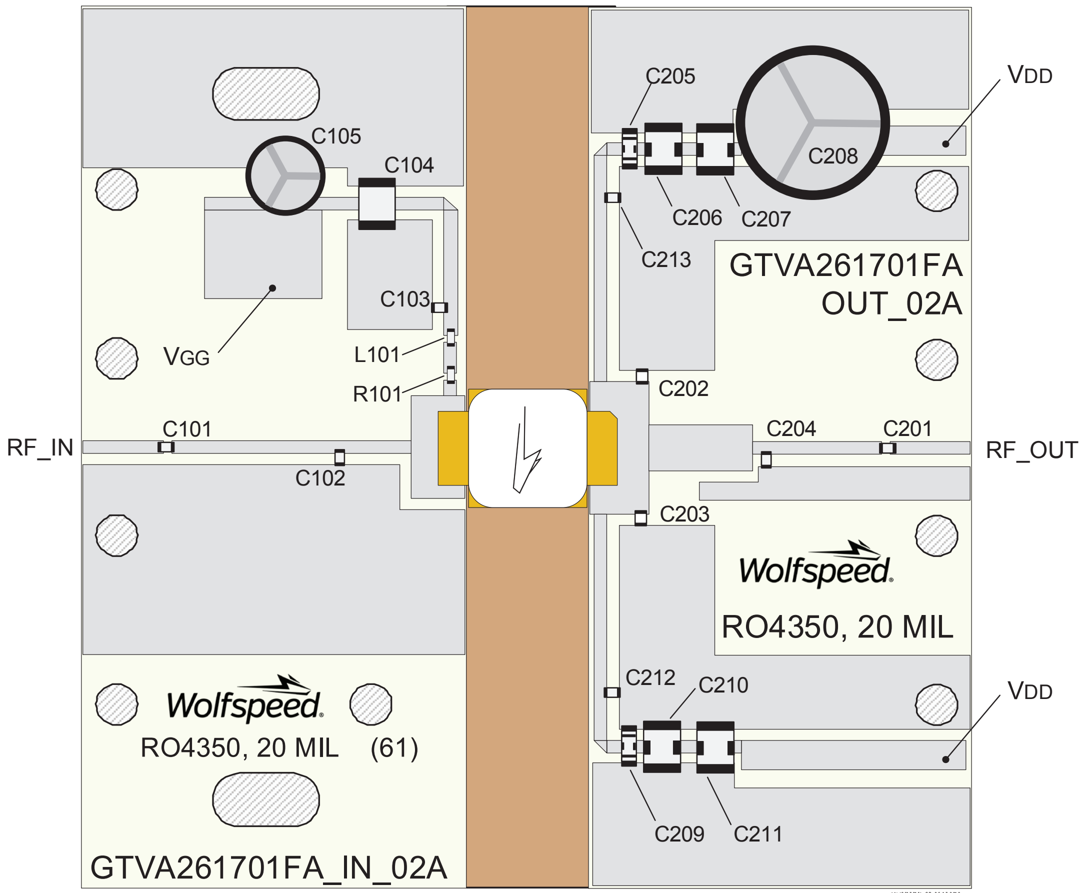
Evaluation Board, 2620 to 2690 MHz

Evaluation Board Part Number	LTN/GTVA261701FA-V1
PCB Information	Rogers 4350, 0.508 mm [.020”] thick, 2 oz. copper, ε_r = 3.66

Find Gerber files for this test fixture on the Wolfspeed Web site at www.wolfspeed.com/RF



Reference circuit assembly diagram (not to scale)

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Components Information

Component	Description	Manufacturer	P/N
Input			
C101, C103	Capacitor, 10 pF	ATC	ATC800A100JT250T
C102	Capacitor, 1.3 pF	ATC	ATC800A1R3CT250T
C104	Capacitor, 0.047 µF	Johanson Dielectrics Inc.	101X43W474MV4E
C105	Capacitor, 100 µF	Panasonic Electronic Components	EEE-FT1V101AP
L101	Inductor, 100 nH	ATC	ATC0603WL101JT
R101	Resistor, 10 ohms	Panasonic Electronic Components	ERJ-8GEYJ100V
Output			
C201, C212, C213	Capacitor, 10 pF	ATC	ATC800A100JT250T
C202, C203	Capacitor, 1.9 pF	ATC	ATC800A1R9CT250T
C204	Capacitor, 1 pF	ATC	ATC800A1R0CT250T
C205, C209	Capacitor, 10000 pF	Johanson Dielectrics Inc.	101X18W103MV4E
C206, C207, C210, C211	Capacitor, 0.047 µF	Johanson Dielectrics Inc.	101X43W474MV4E
C208	Capacitor, 220 µF	Panasonic Electronic Components	ECA-2AHG221

Bias Sequencing

Bias On
1. Ensure RF is turned off
2. Apply pinch-off voltage of –5 V to the gate
3. Apply nominal drain voltage
4. Bias gate to desired quiescent drain current
5. Apply RF

Bias Off
1. Turn RF off
2. Apply pinch-off voltage to the gate
3. Turn-off drain voltage
4. Turn-off gate voltage

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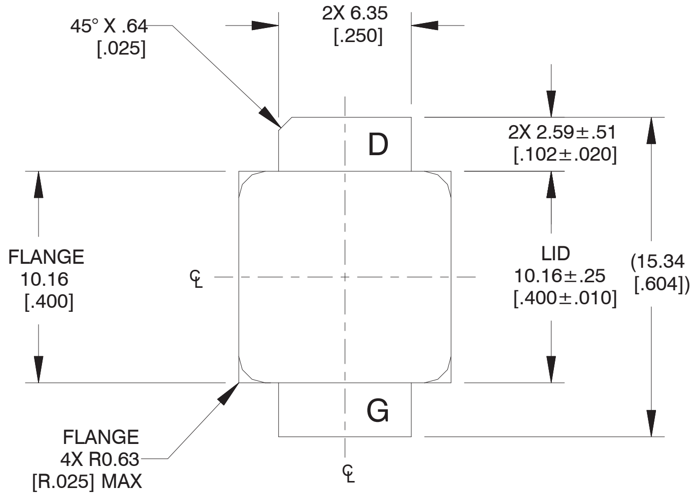
Package Outline Specifications – Package H-37265J-2



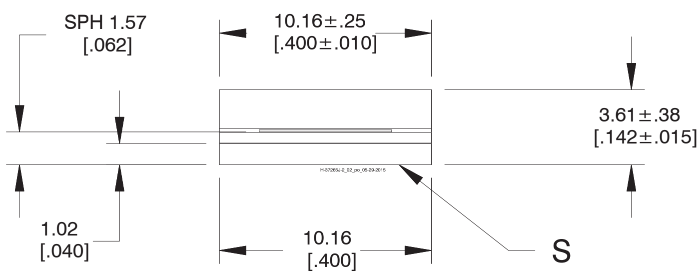


Diagram Notes—unless otherwise specified:

1. Interpret dimensions and tolerances per ASME Y14.5M-1994.
2. Primary dimensions are mm. Alternate dimensions are inches.
3. All tolerances ± 0.127 [.005] unless specified otherwise.
4. Pins: D – drain; G – gate; S – source.
5. Lead thickness: 0.10 + 0.051/-0.025 mm [.004 +0.002/-0.001 inch].
6. Gold plating thickness: 1.14 ± 0.38 micron [45 ± 15 microinch].

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